



COORDINATED HIGHWAYS ACTION RESPONSE TEAM
STATE HIGHWAY ADMINISTRATION

WO56 CHARTWeb Update Detailed Design

Contract SHA-06-CHART
Document # WO56-DS-001
Work Order 56, Deliverable 4

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By
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1 Introduction

1.1 Purpose

This document describes the high level design of the software for WO56 CHARTWeb.

Following is a summary of the major features provided by WO56:

WO56 CHARTWeb Update will include the following items from the WO56 CHARTWeb Update Work Order Request. This work order will implement a set of updates to the CHARTWeb public internet web site.

- **Update Video Player to support HTML5:** Update JW Player from version 6 to version 7. This upgrade is already available to SHA under their current license. NOTE: HTML5 video feeds are not possible until changes are made to the video streaming appliance.
- **Route Based Camera List:** Create a new web page on CHARTWeb to provide a route-based list of traffic cameras.
- **Live Traffic Cameras:** Redesign the live traffic cameras page to utilize responsive tabs.
- **RWIS Detail page:** Update RWIS details page to conform to site design standards.
- **Provide real time data pages in format for display on smartphones:** Update the existing Maryland Highway and Traffic Information, Traffic Alerts and Planned Road Closures web pages to a mobile first, responsive user interface.

Assumptions: The following assumptions are made regarding this set of recommendations

1. HTML 5 video will not be available until an appropriate video stream is provided by the video streaming appliance.
2. Milepost data obtained from the CHART GIS data set will be used to order cameras along a route according to their increasing or decreasing order.
3. Mileposts that increase in value are either in the Northbound or Eastbound direction.
4. Mileposts that decrease in value are either in the Southbound or Westbound direction.
5. The list of cameras may include cameras that are not available on the Internet Map for cameras that do not have latitude/longitude values associated with them.
6. The CCTV tabbed page redesign will be modified as needed to work in a manner that is complimentary to the Route Based Camera page.

1.2 Objectives

The main objective of this detailed design document is to provide software developers with a framework in which to implement the requirements identified in the WO56 CHARTWeb R3.1.0 Software Requirements document.

1.3 Scope

This design is limited to the WO56 CHARTWeb R3.1.0. This design does not include designs for components implemented in other releases of the CHARTWeb or CHART systems.

1.4 Design Process

This design is based on a series of Joint Application Design (JAD) sessions that were held with developers, stake holders, and users. The user interface design is included in this document in the Human Machine Interface section. The requirements have been captured as UML Use Case diagrams, also included in this document. The use case diagrams will be the basis for detailed design.

1.5 Design Tools

The use case diagrams, deployment diagram and sequence diagrams will be extracted from the Confluence Gliffy design tool.

1.6 Work Products

This design document includes the following work products:

- Architectural Deployment diagram, showing the high level architecture of components related to this project.
- Human Machine Interface, describing the functions of the user interface.
- Use Cases, describing the ways that users interact with the system.
- UML Class diagrams, showing the software objects which allow the system to accommodate the uses of the system described in the Use Case Diagrams.
- UML Sequence diagrams showing how the classes interact to accomplish major functions of the system.

2 Architecture

The sections below discuss specific elements of the architecture and software components that are created, changed, or used in WO56 CHARTWeb Update.

2.1 Network/Hardware

2.1.1 CHARTWeb

The WO56 CHARTWeb Update features do not impact the network or hardware architecture of the CHARTWeb system.

2.2 Software

2.2.1 CHARTWeb

The WO56 CHARTWeb Update will use the existing PHP and ASP.NET development environment that is in use for the CHARTWeb web site. As such it will be able to take advantage of all existing CHARTWeb development frameworks and technologies.

2.2.2 COTS Products

Product Name	Description
PHP	The public web site utilizes version 5.6 of the PHP scripting language.
Microsoft .Net Framework	The public web site utilizes the Microsoft .Net framework.
JQuery	The public web site utilizes the JQuery and JQuery plug-ins for client side GUI manipulation and AJAX requests to the server.
Classic ASP	The public web site utilizes version 3 of the ASP scripting language.
Google Maps	The public web site map uses a Google maps base map.
ExtJS	The public web site uses the ExtJS JavaScript library.
Openlayers	The public web site uses the Open Layers JavaScript API 2.8 (http://openlayers.org/) in order to render interactive maps within a web application without relying on vendor specific software. Open Layers is an open source product released under a BSD style license.
Internet Information Services (IIS) for Windows® Server 7.5	The public web site uses Internet Information Services (IIS) for Windows® Server 7.5 for the web server.

2.2.3 Deployment Interface Compatibility

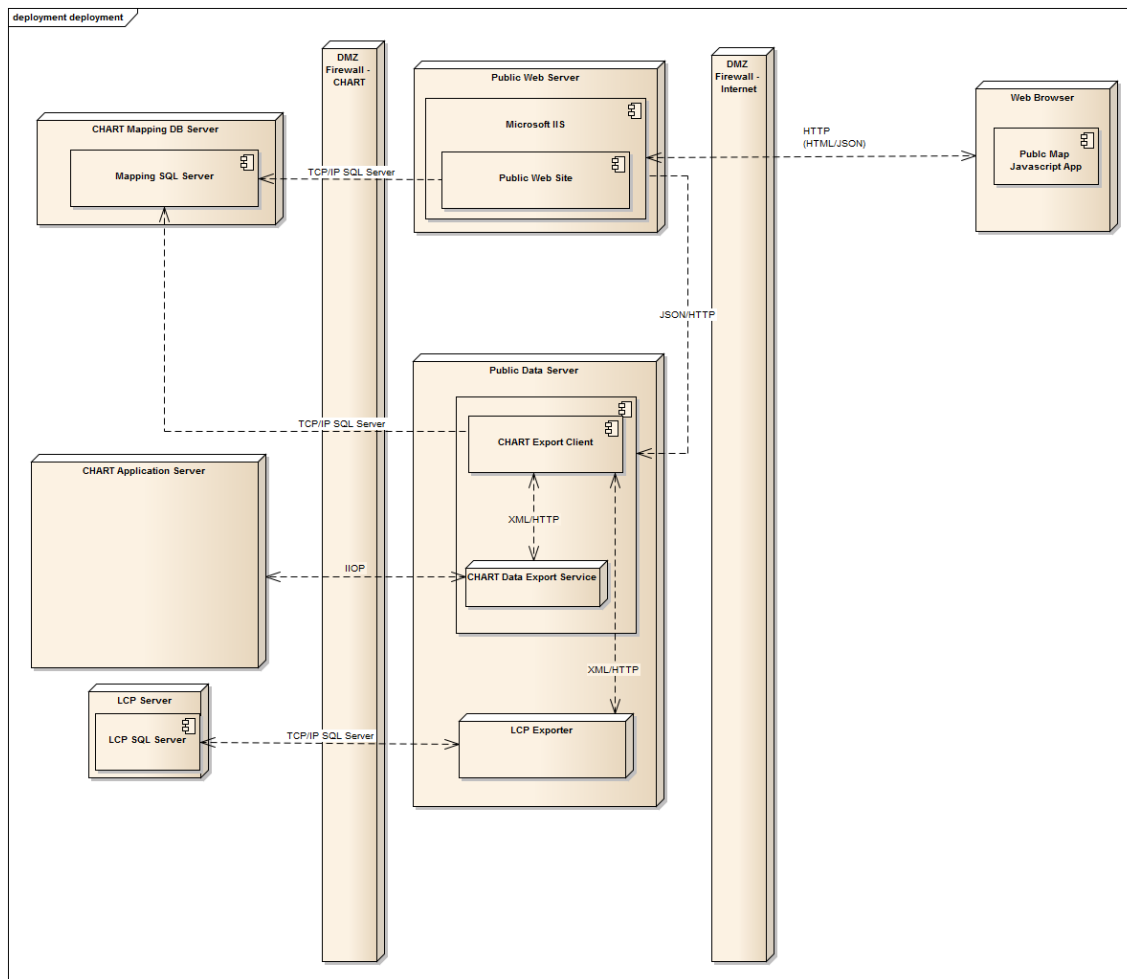


Figure 1 CHARTWeb Interfaces

The above diagram shows the interfaces for CHARTWeb with the following details:

- The system includes a CHART Export Client that is deployed on a “Public Data Server” on the DMZ network. This export client is part of the Apache Tomcat servlet container that the CHART Data Export Service is running in.
- The LCP Exporter queries the production LCP SQL Server through the firewall that sits between the DMZ and the production network. This communication is shown as bi-directional because the LCP Exporter must query data from this server and it must also receive SQL Dependency push updates from the SQL Server when the data in the production database tables changes.

- The CHART Export Client communicates with the LCP Exporter Web Service via HTTP/XML to retrieve initial inventory and subscribe for permit data updates. It also communicates with the CHART Mapping Services deployed on CHART Mapping Application Server via HTTP to notify about permit changes. Permit changes include a change in the geographical location of a permit, new permits added, or any expired/deleted permits.
- The CHART Export Client running on the public data server gets CHART data (DMS, HAR, Traffic Events, TSS, and Cameras) via XML/HTTP communications with the CHART Data Exporter that is running on the same server.
- The CHART Export Client running on the public data server accesses EORS V2 data such as Snow Emergency Plans, IPS, and Hauling Restrictions by querying this information from the Mapping SQL Server running in the production environment on the CHART Mapping DB Server. As depicted above queries from the Public Web Server are already made to this database through the firewall. However, if the access to the necessary port is restricted by IP address of the accessing server a new firewall rule may be required.
- The CHARTWeb Map consumes data from the Public Data Server for display on the map.
- The CHARTWeb text listings pages currently get data via SQL queries from the CHART Mapping DB Server database located inside of the MDOT network.

2.2.3.1 CHARTWeb Interfaces

2.2.3.1.1 External Interfaces

The WO56 CHARTWeb Update will add new JSON/HTTP external interfaces between the user browser and the Microsoft IIS web server for accessing live traffic camera data for camera categories, route based camera lists and data for the popup video camera window.

2.2.3.1.2 Internal Interfaces

The WO56 CHARTWeb Update will continue to utilize SQL Server queries to obtain data from the CHART Mapping DB Server database located inside of the MDOT network.

2.2.4 Security

Features being added for WO56 CHARTWeb Updates do not change security aspects of the CHARTWeb web site.

2.3 CHARTWeb Data

CHARTweb will be tested with the fielded version of Microsoft SQL Server.

3 Key Design Concepts

3.1 Update Video Player to support HTML5

The video player update is straightforward and involves updating the vendor supplied files for the JWPlayer application. The updated JWPlayer version should have no impact on the current design or delivery of CHARTWeb Live Traffic video but will preposition the CHARTWeb web site for future delivery of HTML5 video as well as providing the immediate benefit of security updates and performance improvements for CHARTWeb users viewing live traffic video.

3.2 Route Based Camera List

The design for the Route Based Camera Listing consists of parameters stored in a local configuration file, a server side web service proxy script that communicates with the CHARTEXP2 web service and AJAX calls from the client browser.

The rbcf_config.json file resides on the CHARTWeb server and allows for the configuration of parameters for route cameras. The configuration parameters are shown in the table below.

Parameter	Description
exporterUrl	The URL for the JSON feed that contains the camera data.
data.rbcfId	The unique identifier for a given route.
data.title	The title that will be shown above the list of cameras.
data.startingPoint	The text string that describes the starting point of the route segment when the list is viewed in ascending order.
data.endingPoint	The text string that describes the ending point of the route segment when viewed in ascending order.
data.routePrefix	The prefix for the route type. Usually includes values such as “IS”, “MD” and “US”. For IS-95 this would be “IS”
data.routeNumber	The number for the route that corresponds to the route prefix. For IS-95 this would be “95”.
data.startingMp	The starting mile point for the segment when viewed in ascending order.
data.endingMp	The ending mile point for the segment when viewed in ascending order.
data.sortOrder	The default sort order for the segment. All sort orders are determined by the camera milepost value.
data.userDefined Only	The userDefinedOnly flag determines whether or not the user defined list of cameras under data.extraCamsInclude should be the only values used for the route segment. If set to true then the application will display the extraCamsInclude list as well as the list defined by routeNumber and routePrefix. If set to false then the application will ignore anything but the cameras defined in the extraCamsInclude list.

Parameter	Description
data.extraCamsInclude	<p>An array of camera objects that are to be manually included in the segment. Each array element should consist of a camera object that contains the name of the camera, milepost value, IP address for the video streaming device, unique camera identifier and public URL for viewing the camera popup window.</p> <p>Example:</p> <pre> "extra_cams_include" : [{ "name": "EXTRA CAMERA 1", "milepost": 0, "ip" : "1.2.3.4", "id": "0f019fd7443a0032004606363d235daa", "publicVideoURL" : "http://www.chart.state.md.us/video/video.php?feed=0f019fd7443a0032004606363d235daa"}, { "name": "EXTRA CAMERA 2", "milepost": 1, "ip" : "1.2.3.4", "id": "7d015d1d00e10039004606363d235daa", "publicVideoURL" : "http://www.chart.state.md.us/video/video.php?feed=7d015d1d00e10039004606363d235daa"}]</pre>
data.extraCamsExclude	<p>An array of camera id objects that are used to manually remove cameras from a route segment. These are the IDs of the cameras that appear in the JSON camera data feed.</p> <p>Example:</p> <pre> "extra_cams_exclude" : [{"id": "0f019fd7443a0032004606363d235daa"}, {"id": "ABCDEF19fd7443a0032004606363d235daa"}]</pre>

Once the value for the route segment configuration is read in, a user interface is generated that provides the user with a list of routes to choose from. When the user selects a route segment to view, an ordered list of cameras along that route are displayed in ascending order. Hyperlinks are displayed at the start of the list that provides the ability for a user to reverse the sort order of cameras along the route. When the list of cameras is viewed in descending sort order the configuration values for startingPoint and endingPoint are also reversed. All of this is made possible by the getCamerasFromJson server side method which communicates directly with the JSON web service and filters the results set to only those cameras which are needed for a particular route segment. This server to server communication also provides JSON data from the CHARTEXP2 web service without the need to deal with browser based Cross Origin Resource Sharing (CORS) issues. Custom camera lists can be added using the extraCamsInclude array

which allows predefined camera objects to be added. The system will attempt to automatically fill in any camera details that are empty (or -1 on the case of numerical values) based upon matches found against the identifier found in the JSON data set.

3.2.1 External Export Client Updates

The external CHART Export Client Service provides a JSON feed for the available cameras for use by the external clients (such as CHART on the Web). The existing JSON feed provides attributes such as location (latitude/longitude), current status, URL for live feed, etc. The JSON feed for WO56 has been enhanced to include the Route information (prefix, number and suffix) and the closest state mile post for a camera if available. The information is queried from the state provide mile post data set by snapping a camera based on their latitude/longitude location and additional route information if available in ATMS. The camera that is snapped to a location on the State provided mile post dataset might contain conflicts with the overlapping routes (such as overpasses and underpasses). The winner location is chosen based on priority given first to the major roadway location. These additional attributes added to the JSON feed will aid in sorting the list of cameras for a route when traversed in a particular direction.

3.3 Live Traffic Cameras

The Live Traffic Cameras page will be integrated with the Route Based Camera List to provide a single place for CHARTWeb users to view live traffic camera data. The new user interface will provide a single toolbar with options for viewing cameras by categories or by routes.

3.4 RWIS Details

The current RWIS text based data pages on CHARTWeb provide a list of RWIS devices and associated RWIS station data along with a hyperlink to more detailed information. In the past the detailed information pages provided an image from the now retired SCAN application as well as additional wind gust data. Consequently, updated camera images are no longer available. This update will remove the hyperlinked details page and provide additional columns of data on the main RWIS listing page that provides the wind gust data that was previously available only on the RWIS details page.

3.5 Provide real time data pages in format for display on Smart Phones

Previous versions of CHARTWeb used table layouts for the events listed on the Maryland Highway & Traffic Information, Traffic Alerts and Lane Closure pages. In the interest of making the site more accessible, the table layouts will be replaced with a table less design. Also, in previous versions, the lane configuration diagrams were created with html tables using images and colored backgrounds. That layout does not scale well to the small screens of smart phones.

Release 3.1 of CHARTWeb will generate lane configuration diagrams by dynamically generating SVG images. The SVG images scale well to small screens.

Another design decision taken for Release 3.1 is to replace the single code file of previous versions with a collection of PHP classes to organize the code and make it easier to maintain. Below is a class diagram of the classes used.

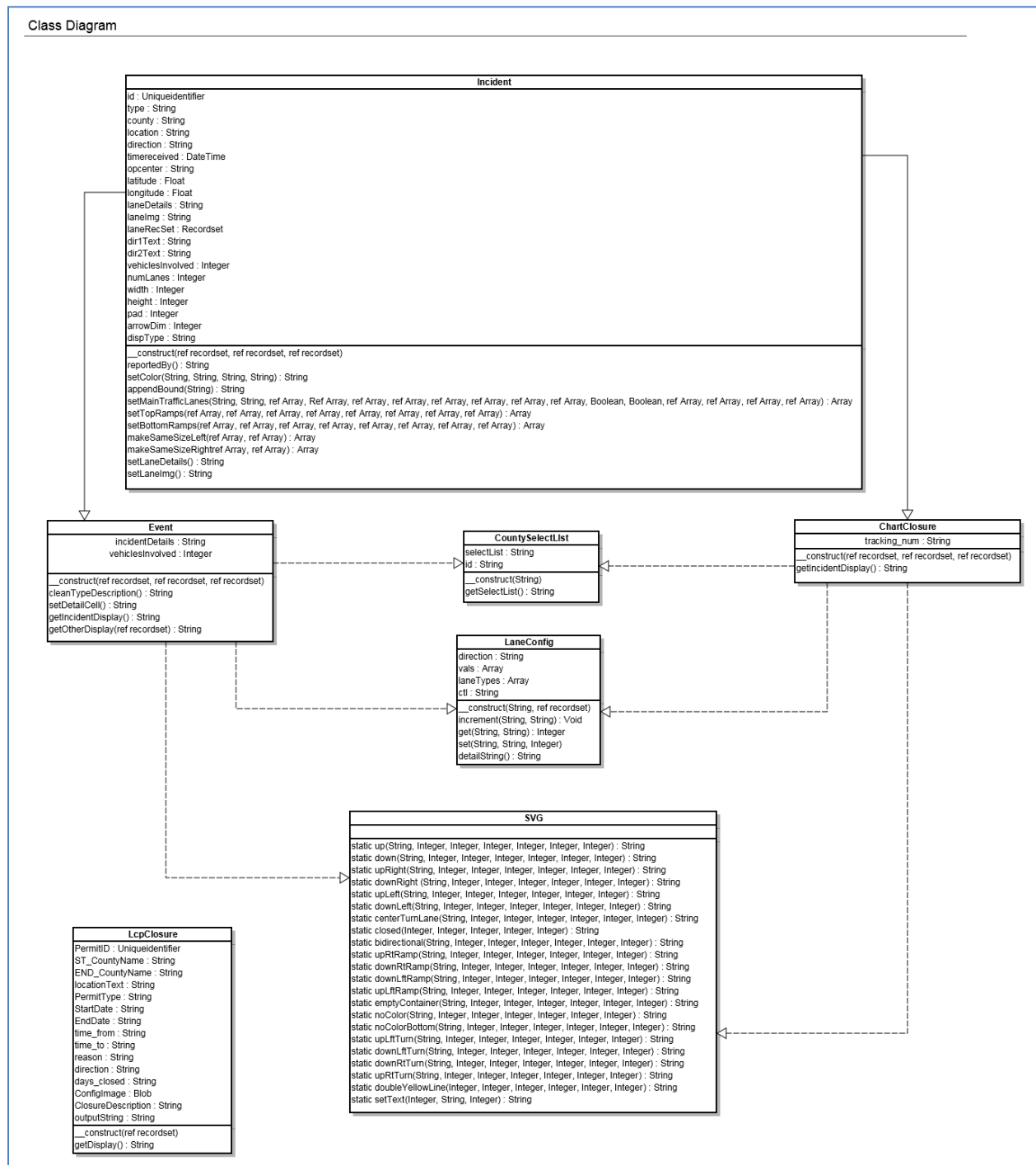


Figure 2: Incidents Class Diagram

There are four classes representing the different types of events to be reported.

The LcpClosures class handles closures input via the LCP application. These are the simplest closures to display since the lane configuration description and diagram are retrieved from the database without the need for further processing.

There are three classes required to report ATMS Traffic Incidents, ATMS Weather Related Incidents and ATMS Planned Road Closures. The main class is the Incidents.php class. This class contains most of the data and methods required to display an incident. The Event.php class inherits from Incidents and provides some additional functionality unique to ATMS Traffic Incidents and ATMS Weather Related Incidents. Events.php also handles the Other Traffic Incidents and Traffic Alerts. The ChartClosures.php class inherits from Incidents.php and provides additional functionality unique to ATMS Planned Road Closures.

In addition to the main incident type classes, there are three helper classes.

The CountySelectList.php class simply creates drop down lists of counties in Maryland.

The LaneConfig.php class maintains a list of lanes for each event. It keeps counters of the number of each type of lane and their states. It also provides a public method to get the lane configuration description string.

The last helper class is SVG.php. This class contains a list of static methods to create SVG images for each type of lane and state. Each event lane configuration is a collection method call results to this class.

3.5.1 Maryland Highway & Traffic Information Page

The GUI and functionality for the Maryland Highway & Traffic Information page will not be changed appreciably in Release 3.1. The page will display a 3-tabbed interface containing incident and closure data. The page data will be refreshed at 90 second intervals via AJAX calls to a PHP file on the server (response.php). The response.php file creates arrays of display data by querying the database and creating the appropriate types of objects. Each object in the array is a completely self-contained display object with the entire HTML required to print it to the screen. Below is a sequence diagram of a single cycle of page loading. AJAX refreshes repeat the cycle.

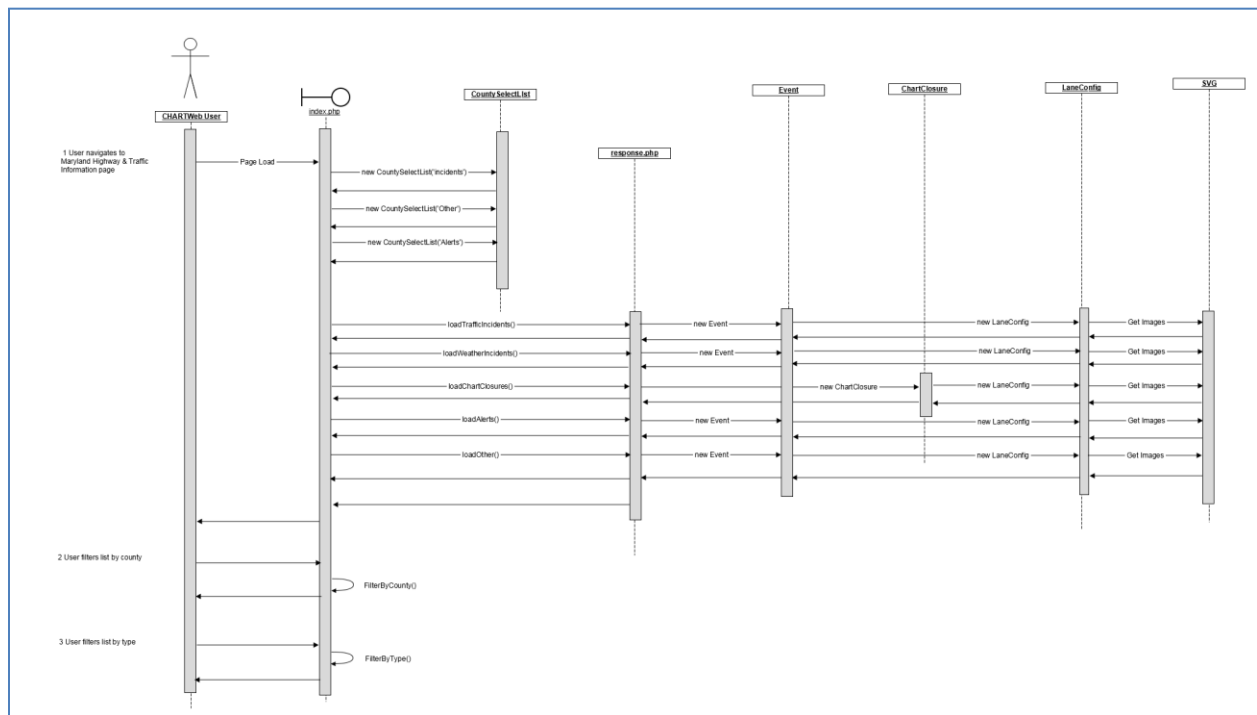


Figure 3: Maryland Highway & Traffic Information Page Sequence Diagram

3.5.2 Planned Road Closures Page & I-95 Express Toll Lane Closures Page

The Planned Road Closures and I-95 Express Toll Lanes Closures pages only differ by the database query used to fetch the display data. The landing page for planned closures is still the original .ASP page. However, links on the page have been changed to point to new PHP pages that will be more responsive and accessible. Table layouts for these pages have been replaced with <div> layouts. Since the sequence diagrams for the Planned Road Closures and I-95 Express Toll Lane Closures pages are nearly identical, only the sequence diagram for the Planned Road Closures page is shown below.

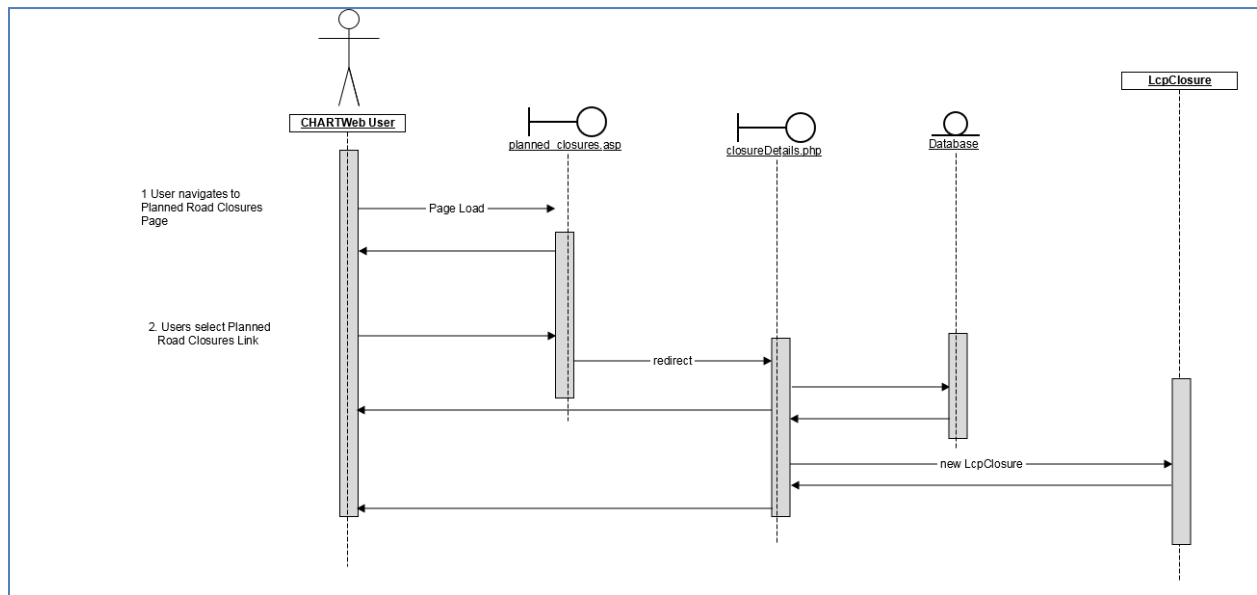


Figure 4: Planned Road Closures Sequence Diagram

4 Human Machine Interface

4.1 CHARTWeb

This section describes the WO56 CHARTWeb Update User Interface

4.1.1 Update Video Player to support HTML5

The updated JWP Player version is 7.3.6. While most users will not notice UI changes the player version can be verified by right clicking on the popup video player window when accessing the application using a standard desktop web browser.



Figure 5 Popup video player window

4.1.2 Route Based Camera List

The CHARTWeb Update Route Based Camera list will display a list of cameras that is reversible and sorted by milepost in the direction of travel along the route.

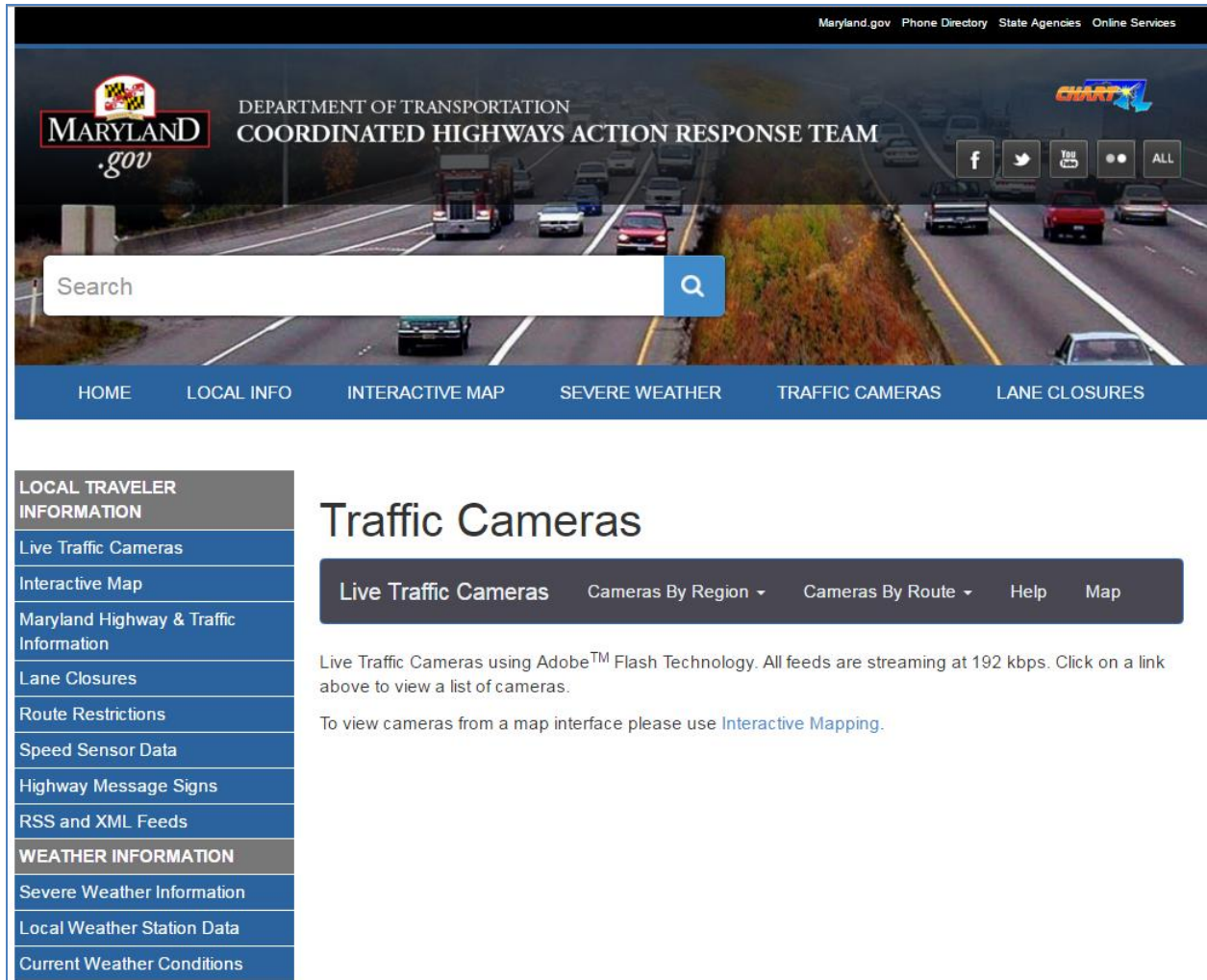




Figure 6 Traffic Cameras Main Page






By default the page will load with the camera help text displayed in the main content area. The new layout integrates all cameras listings into a single user interface. Route Based Camera Lists will be accessed via the Cameras by Route drop down list.


[Maryland.gov](#)
[Phone Directory](#)
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[HOME](#)
[LOCAL INFO](#)
[INTERACTIVE MAP](#)
[SEVERE WEATHER](#)
[TRAFFIC CAMERAS](#)
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LOCAL TRAVELER INFORMATION

[Live Traffic Cameras](#)
[Interactive Map](#)
[Maryland Highway & Traffic Information](#)
[Lane Closures](#)
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[Speed Sensor Data](#)
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[RSS and XML Feeds](#)

WEATHER INFORMATION

[Severe Weather Information](#)
[Local Weather Station Data](#)

Traffic Cameras

[Live Traffic Cameras](#)
[Cameras By Region](#)
[Cameras By Route](#)
[Help](#)
[Map](#)

Live Traffic Cameras using Adobe™ Flash Technology. All above to view a list of cameras.

To view cameras from a map interface please use [Interactive Map](#)

I-95 from DE State Line to I-695 Baltimore
I-95 from I-695 Baltimore to I-495 DC
I-695 Baltimore Beltway Top Side
I-695 Baltimore Beltway Bottom Side
I-95/495 from I-95 to Woodrow Wilson Bridge
I-95/495 from I-95 to American Legion Bridge
I-270 from I-70 to I-95/495
I-895 South to North
I-70 from West Virginia State Line to I-695 Baltimore Beltway
I-68 from WV State Line to I-70

Figure 7 Traffic Cameras Main Page Drop Down List

When the drop down list is clicked on the title for the route segments (taken from the RBCL Configuration file) will display the available route segments.

[HOME](#)
[LOCAL INFO](#)
[INTERACTIVE MAP](#)
[SEVERE WEATHER](#)
[TRAFFIC CAMERAS](#)
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LOCAL TRAVELER INFORMATION

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Traffic Cameras

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[Help](#)
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Cameras By Route from Maryland-Delaware State Line to I-95 At I-695 Baltimore Beltway

Starting from Maryland-Delaware State Line (Click to reverse order)

- MPEG2 I-95 S of Md 213 Singerly Rd (C002) MP 105.9
- MPEG2 I-95 N of Md 272 (C003) MP 100.0
- MPEG2 I-95 S of Md 272 (C004) MP 99.5
- MPEG2 I-95 S of Chesapeake H. (C006) MP 96.4
- MPEG2 I-95 N of Md 222 (C007) MP 93.4
- MPEG2 I-95 S of Md 222 (C008) MP 93.1
- MPEG2 I-95 S of Frenchtown Rd (C009) MP 92.2

Figure 8 Route Based Camera Listing Default Sort Order

After selecting a route, all available cameras on the route are displayed from the starting milepost to the ending milepost in the sort order specified in the RBCL Configuration file.

[HOME](#)
[LOCAL INFO](#)
[INTERACTIVE MAP](#)
[SEVERE WEATHER](#)
[TRAFFIC CAMERAS](#)
[LANE CLOSURES](#)

LOCAL TRAVELER INFORMATION

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[Help](#)
[Map](#)

Cameras By Route from I-95 At I-695 Baltimore Beltway to Maryland-Delaware State Line

[Starting from I-95 At I-695 Baltimore Beltway \(Click to reverse order\)](#)

- FMT, Bore 4, NB, 4-09
- FMT, Bore 2, SB, 2-13
- FMT, Bore 2, SB, 2-15
- FMT, Bore 2, SB, 2-14
- FMT, Bore 2, SB, 2-10
- FMT, Bore 3, NB, 3-01

Figure 9 Route Based Camera Listing Reverse Sort Order

Clicking the “Click to reverse order” link will provide the same list of cameras sorted in a descending direction by milepost value associated with the camera.

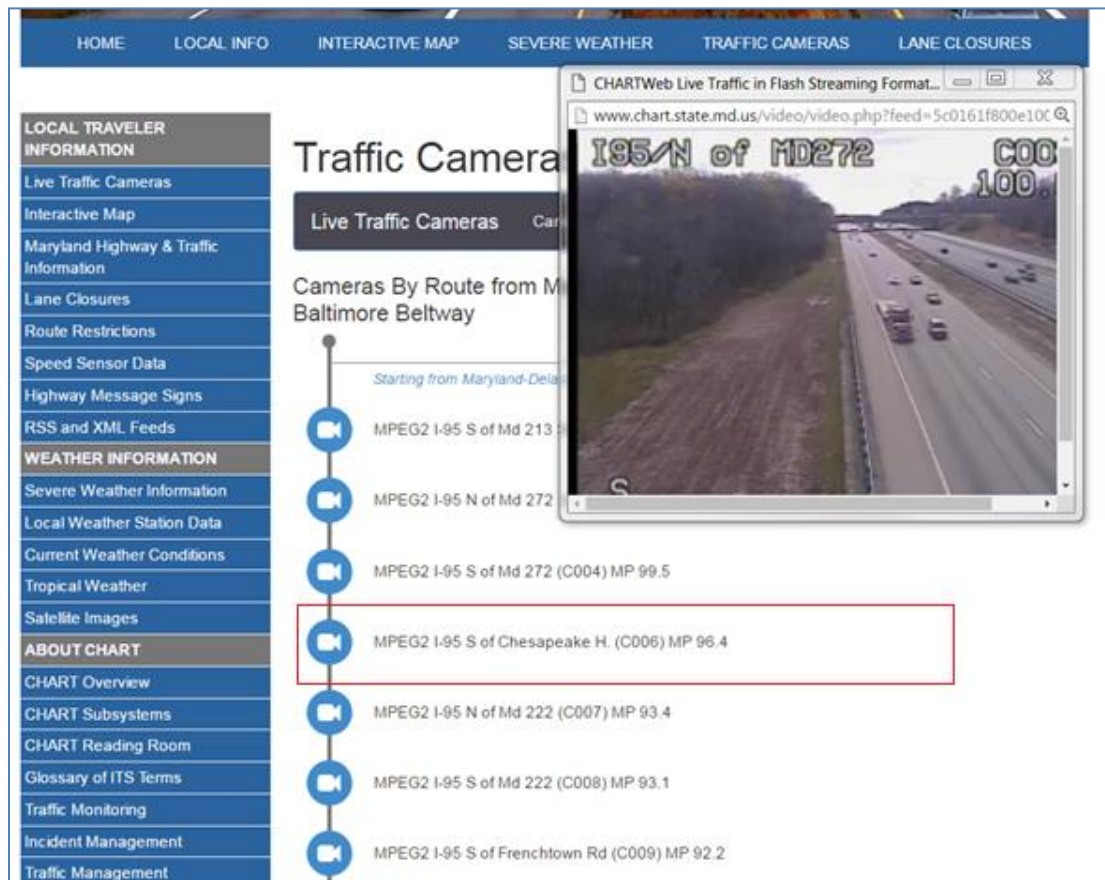


Figure 10 Route Based Camera Listing Clickable Area

Each camera and icon occupies a span area on the page with an attached event handler. This provides the ability to create clickable regions so a user doesn't have to click around for the link that launches the popup video window. This is especially useful for mobile devices.

Traffic Cameras

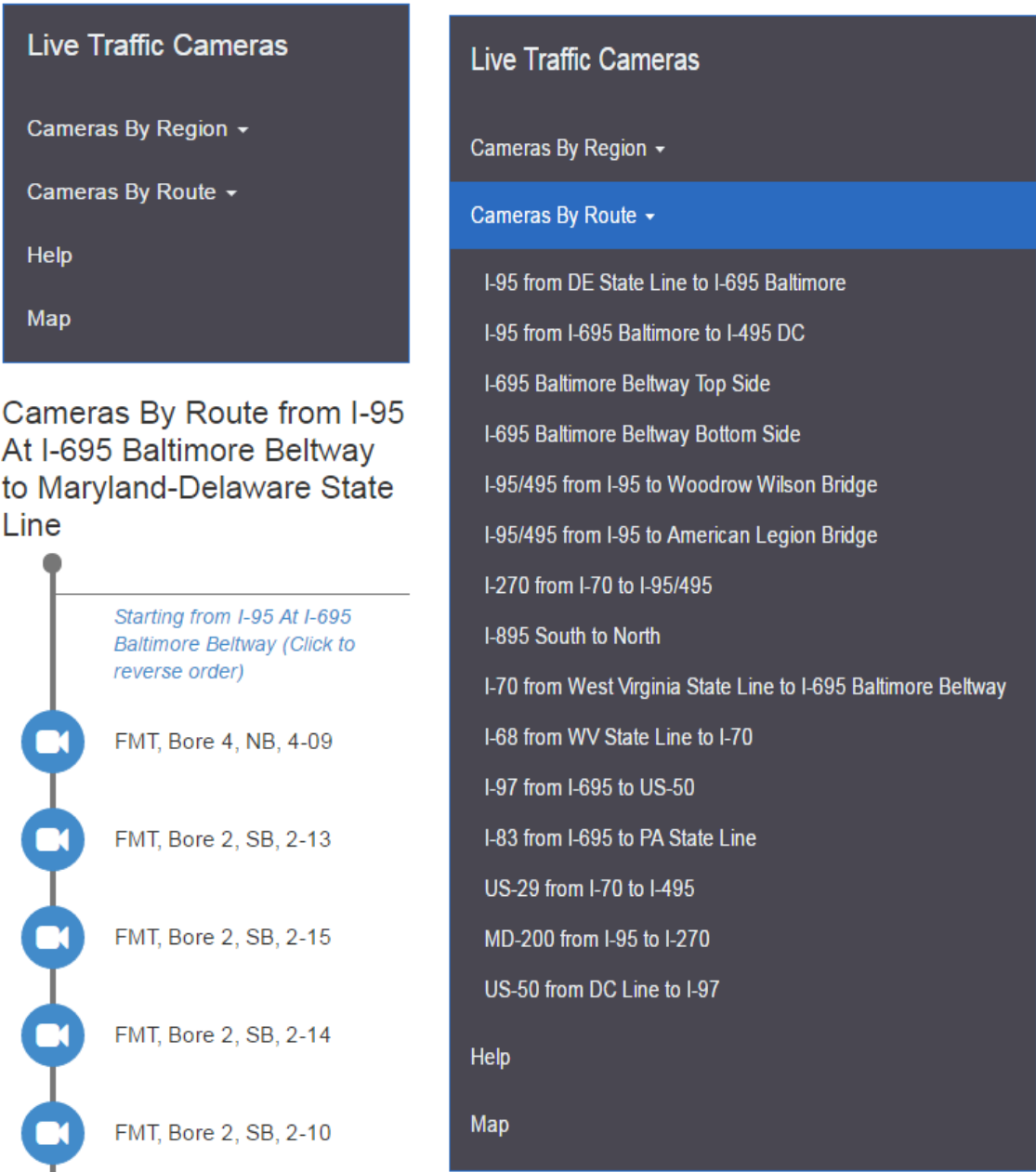
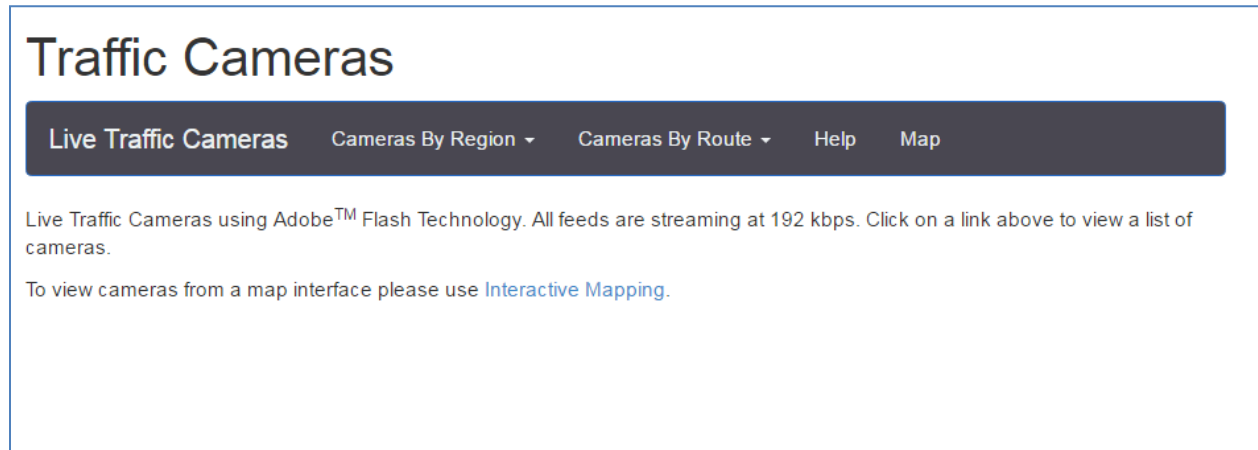


Figure 11 Route Based Camera Listing Mobile Device View

When viewed on a mobile device the user interface will automatically adjust according to the device’s screen width. Mobile devices will not get the popup video window; instead they will play the live traffic video using the HTTP Live protocol using their native players.

4.1.3 Live Traffic Cameras (Cameras by Region)

The Live Traffic Cameras page will consolidate all camera capabilities on a single page. On the initial page load the main content area will display the camera help text. Otherwise, when Cameras by Region or Cameras by Route options are selected the user interface will display a listing of cameras. When the Map link is clicked the user will be taken to the Interactive Mapping page.



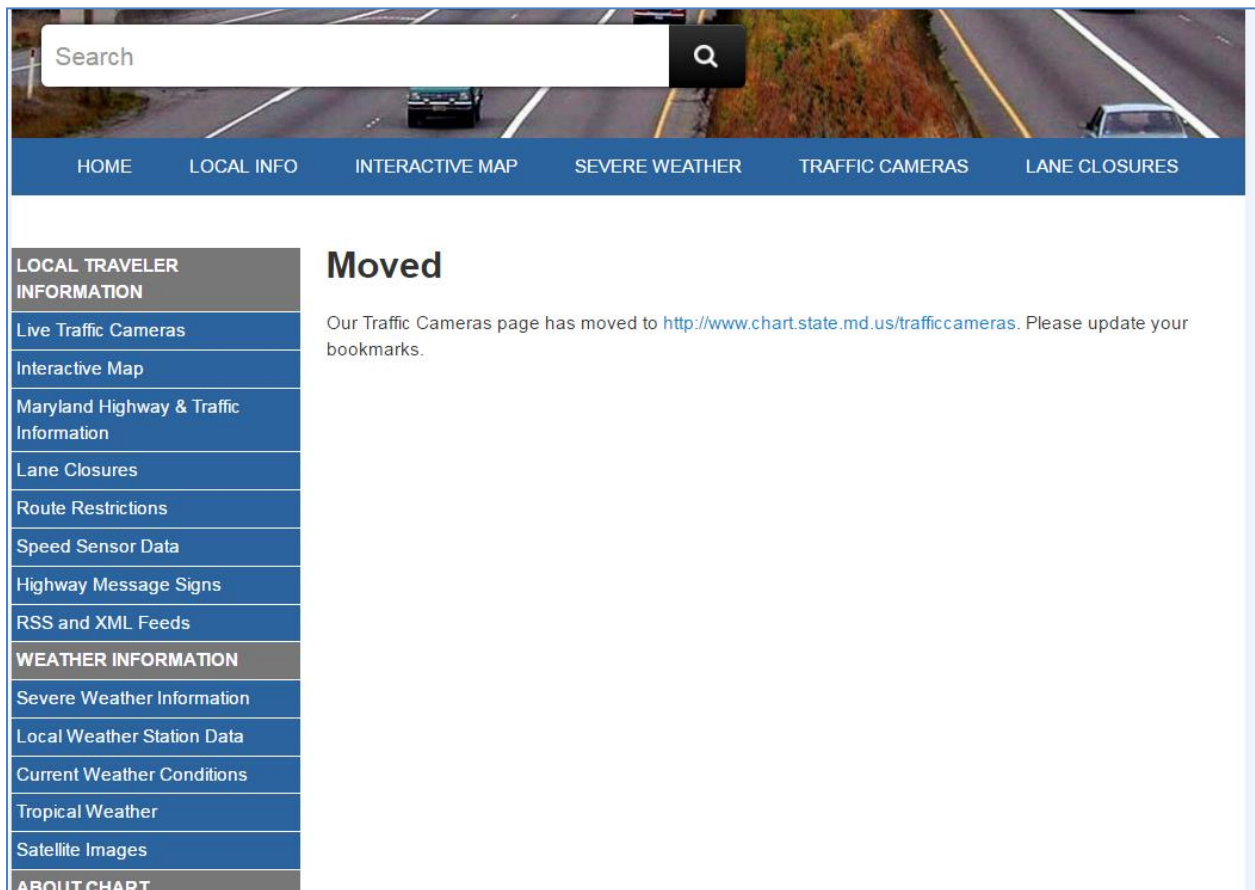


Figure 12 Old Live Traffic Cameras Page Retired

Since the new Live Traffic Cameras page uses a different URL structure, the previous Live Traffic Cameras page will be updated to inform user of the location of the new page.

4.1.4 RWIS Detail Page

The RWIS Detail page will be removed and the main RWIS listing page will be updated to remove the links to download historical weather data. Previously the location name for the RWIS device was used to link to the details page. While the text for the location will remain, the hyperlink will be removed. In addition, the Intensity and Visibility columns will be removed.

Maryland Weather Station Data											
Download Historical Weather Data											
SEARCH: <input type="text"/>											
Location	Air	RH	Dwp	Precip Type	Intensity	Visibility	Wind Speed	Direction	Pavement Temperature	Date/Time	
Hatem Bridge US 40 E/B	68	24	25	None	-	-	-	NW	86 - 86	4/20/2016	1:05:01 PM
I-270 AT I-370	68	18	23	None	-	-	Calm	SE	98 - 105	4/20/2016	1:05:01 PM
I-270 AT MD-109	65	23	27	None	-	-	4 mph	SE	97 - 98	4/20/2016	1:05:01 PM
I-495 AT American Legion Bridge	68	19	25	None	-	-	4 mph	S	95 - 98	4/20/2016	1:05:01 PM
I-68 AT MD-219	57	26	23	None	-	-	12 mph	SE	87 - 95	4/20/2016	1:05:01 PM
I-68 AT Savage Mt	56	29	24	None	-	-	8 mph	E	96 - 98	4/20/2016	1:05:01 PM
I-68 AT Sideling Hill	63	20	21	None	-	-	4 mph	S	102 - 107	4/20/2016	1:05:01 PM

4.1.5 Provide real time data pages in format for display on smartphones (Maryland Highway & Traffic Information Page)

The Maryland Highway & Traffic Information page will display a tabbed interface containing ATMS Traffic Incidents, ATMS Weather Related Incidents, ATMS Road Closures, Other ATMS Traffic Events and Traffic Alerts. If there are no Traffic Alerts when the page is loaded, the Traffic Alerts tab will not be displayed.


The Maryland Highway & Traffic Information page will use AJAX polling of the CHARTWeb database to check for updates to the data and update the page without a complete page reload. If Traffic Alert Incidents become available, the Traffic Alerts tab will be shown. Likewise, if all Traffic Alerts are closed, the Traffic Alerts tab will be hidden on the data refresh.

Each event will contain the following information:


- Type of Event
- Location
- Direction
- Lane Configuration & Closure Details
- Lane Configuration Image






If no lane data is available, a message indicating the lack of lane data will replace the lane configuration details and image.


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Maryland Highway & Traffic Information

Traffic incidents, weather road closures, active construction and maintenance closures information.

[Click here for traffic event descriptions](#)

Traffic Incidents & Closures

Other Traffic Events

Traffic Alerts

This data will refresh every 90 seconds
Last refreshed at: 8:58:50 AM
Filter Data By County:
*Note: If your county is not displayed, it means we have no reported activity in that county.
Filter Data By Type:

Traffic Incidents

Alegany County: MD 135 EAST/WEST BETWEEN GRANT ST AND PRATT ST

Figure 13: Maryland Highway & Traffic Information Page – Desktop Browser

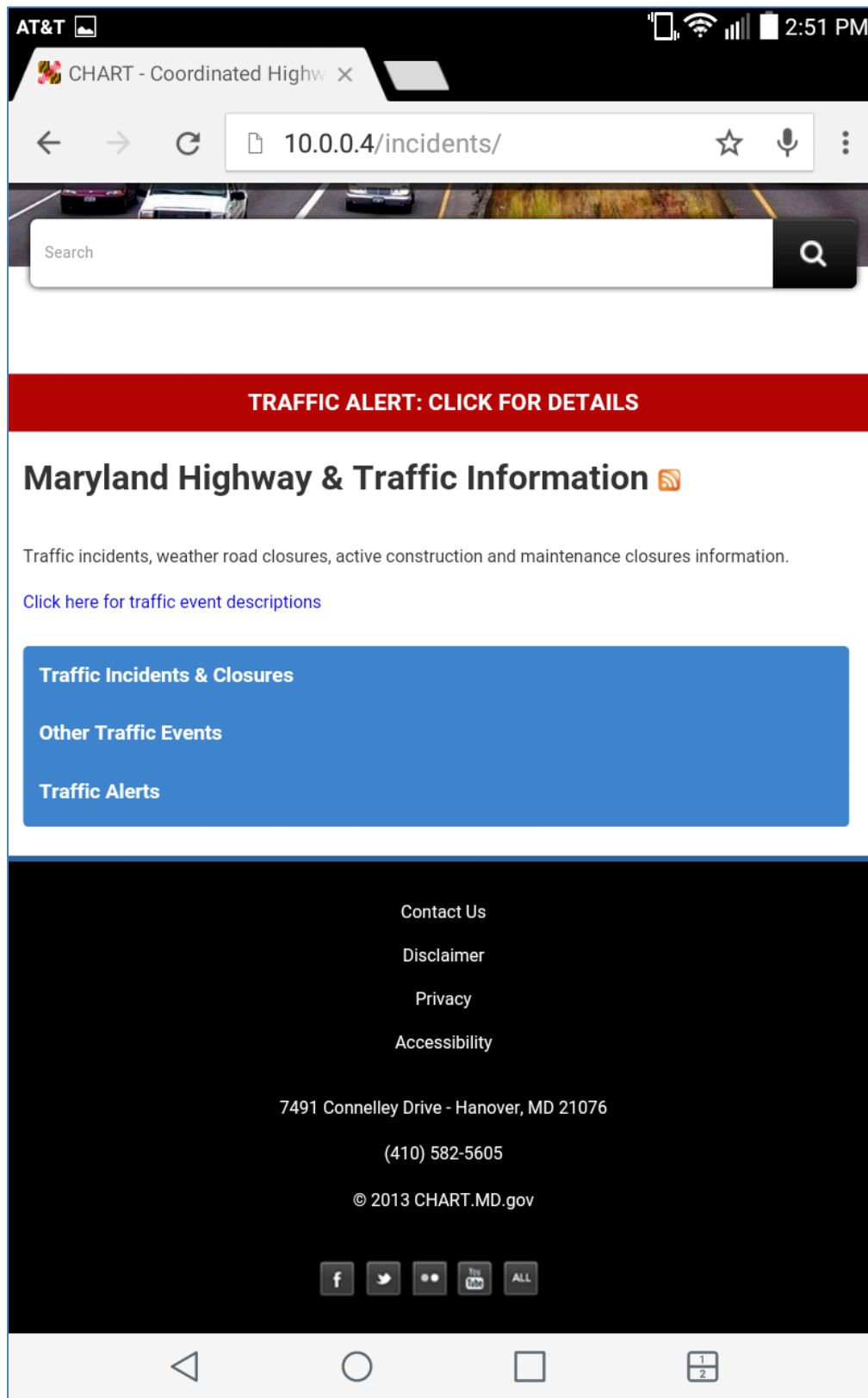


Figure 14: Maryland Highway & Traffic Information Page – Smartphone

Data on the Traffic Incidents & Closures may be filtered by county and/or incident type. When the user selects a county, only events declared within the selected county will be displayed. Likewise, when the user selects an event type, only events of the selected type(s) will be displayed. The available options for selecting by event type are:

- Show All
- Traffic Incidents Only
- Traffic Incidents & Weather Events
- Weather Events Only
- Roadwork

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Traffic Alerts

This data will refresh every 90 seconds
Last refreshed at: 9:00:20 AM
Filter Data By County:

All Counties
Allegany
Anne Arundel
Baltimore
Baltimore City
Calvert
Caroline
Carroll
Cecil
Charles
Dorchester
Frederick
Garrett
Harford
Howard
Kent
Montgomery
Prince George's
Queen Anne's
Somerset
St Mary's
Talbot
Washington
Wicomico
Worcester

*Note: If your county is not displayed, no activity has been reported in that county.
Filter Data By Type:

Traffic Incidents

Type	Allegany
Location	
Direction	
Details	
Lane Configuration Data	

ST/WEST BETWEEN GRANT ST AND PRATT ST	
Type	
Location	
Direction	
Details	
Lane Configuration Data	

Anne Arundel County: US 50 EAST EAST OF OCEANIC DR (BAY BRIDGE TOLL PLAZA)

Type	Incident (Other)
Location	Anne Arundel County [US 50 EAST EAST OF OCEANIC DR (BAY BRIDGE TOLL PLAZA)]
Direction	East
Details	1 Vehicle Involved All Westbound Lanes Open 2 of 11 Eastbound Toll Lanes Closed 2 of 11 Eastbound Toll Lanes Bidirectional Created: 2016-04-04 08:52:44.600 by CHART Support
Lane Configuration Data	<div> <div>Westbound</div> <div>Eastbound</div> </div> <div> <div> ↓ ↓ ↓ ↓ ↓ </div> <div> ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ </div> </div>

Figure 15: Traffic Incidents & Closures - Filter by County

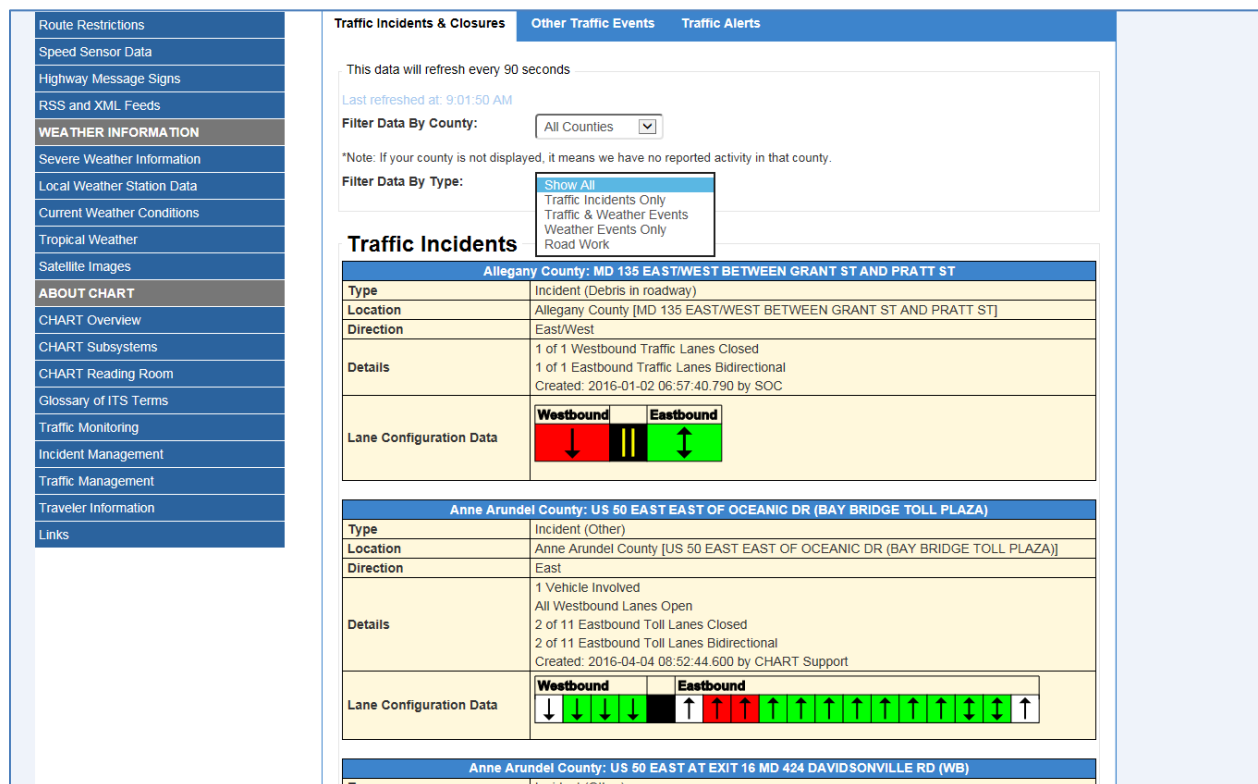


Figure 16: Traffic Incidents & Closures - Filter by Event Type

Since road configurations vary with each roadway and they may become very large, the lane configuration diagram will draw the lane images at different sizes to make sure they fit within their container. The default size for a lane image is 40 x 40 pixels. If the lane configuration contains 15 – 20, the image size will be reduced to 30 x 30 pixels. If the lane configuration contains 20 – 25 lanes, the image size will be 25 x 25 pixels. If the lane configuration contains more than 25 lanes the image size will be 20 x 20 pixels. In the event that the road consists of a single lane in one or both directions (with or without some type of divider) the lane image will be expanded to 80 x 40 pixels to make room for the direction text.

Details	1 of 4 Southbound Traffic Lanes Closed All Northbound Lanes Open Created: 2016-04-05 10:47:05.423 by CHART Support
Lane Configuration Data	<div> <div>Southbound</div> </div> <div> <div>Northbound</div> </div>
Harford County: I-95 SOUTH/NORTH AT J F K MEMORIAL HWY	
Type	Incident (Other)
Location	Harford County [I-95 SOUTH/NORTH AT J F K MEMORIAL HWY]
Direction	North/South
Details	3 of 12 Southbound Toll Lanes Closed 1 of 12 Southbound Toll Lanes Unknown 1 of 12 Northbound Toll Lanes Closed 1 of 12 Northbound Toll Lanes Unknown Created: 2016-04-05 10:17:14.490 by CHART Support
Lane Configuration Data	<div> <div>Southbound</div> </div> <div> <div>Northbound</div> </div>
Howard County: I-70 EAST/WEST	
Type	Incident (Other)
Location	Howard County [I-70 EAST/WEST]
Direction	East/West
Details	2 of 2 Westbound Collector Distributors Closed 1 of 1 Westbound Right OffRamps Closed 2 of 3 Westbound Shoulders Closed 7 of 8 Westbound Traffic Lanes Closed 2 of 2 Eastbound Collector Distributors Closed 1 of 1 Eastbound Right OffRamps Closed 3 of 3 Eastbound Shoulders Closed 6 of 8 Eastbound Traffic Lanes Closed Created: 2016-04-05 10:01:07.987 by CHART Support
Lane Configuration Data	<div> <div>Westbound</div> </div> <div> <div>Eastbound</div> </div>
Montgomery County: MD 190 EAST AT COUNSELMAN RD	
Type	Incident (Collision)
Location	Montgomery County [MD 190 EAST AT COUNSELMAN RD]
Direction	East
Details	1 Vehicle Involved All Westbound Lanes Open 1 of 1 Eastbound Shoulders Closed 2 of 2 Eastbound Traffic Lanes Closed Created: 2016-01-20 13:50:15.490 by TOC3
Lane Configuration Data	<div> <div>Westbound</div> </div> <div> <div>Eastbound</div> </div>

Figure 17: Varying Lane Image Sizes

Traffic Incidents will scale to the smaller screens of smart phones:

Anne Arundel County: MD 32 EAST PRIOR TO MD 198

**Baltimore County: I-695 OUTER LOOP PRIOR TO
EXIT 27A MD 146 DULANEY VALLEY RD (NB)**

Type	Incident (Debris in roadway)
Location	Baltimore County [I-695 OUTER LOOP PRIOR TO EXIT 27A MD 146 DULANEY VALLEY RD (NB)]
Direction	Outer Loop
Details	No lane data availableCreated: 2015-11-13 09:49:05.320 by TOC4
Lane Configuration	No lane data available

Figure 18: Traffic Incident on Smart Phone

The Traffic Incidents & Closures tab will display Weather Related Incidents from ATMS when they exist. If none exist, a message stating that there are no weather related incidents exist will be displayed. ATMS Weather Related Incidents will be displayed with a background color set to 'Gainsboro' to easily distinguish them from ATMS Traffic Incidents ('Corn silk') and ATMS Road Closures (blue).

Weather Events					
Anne Arundel County: I-97 SOUTH/NORTH AT BENFIELD BLVD					
Type	Incident (Weather Closure Winter Precip)				
Location	Anne Arundel County [I-97 SOUTH/NORTH AT BENFIELD BLVD]				
Direction	North/South				
Details	1 of 1 Southbound Left Acceleration Lanes Closed 1 of 1 Northbound Left Acceleration Lanes Closed Created: 2016-04-05 09:30:56.610 by CHART Support				
Lane Configuration Data	<table> <tr> <th>Southbound</th><th>Northbound</th></tr> <tr> <td>↓ ↓ ↓</td><td>↑ ↑ ↑</td></tr> </table>	Southbound	Northbound	↓ ↓ ↓	↑ ↑ ↑
Southbound	Northbound				
↓ ↓ ↓	↑ ↑ ↑				
Anne Arundel County: I-97 SOUTH/NORTH AT BALTO ANNAPOLIS BLVD					
Type	Incident (Weather Closure High Water)				
Location	Anne Arundel County [I-97 SOUTH/NORTH AT BALTO ANNAPOLIS BLVD]				
Direction	North/South				
Details	1 of 1 Southbound Right Acceleration Lanes Closed 2 of 2 Southbound Right OffRamps Closed 1 of 2 Southbound Shoulders Closed All Northbound Lanes Open Created: 2016-04-05 09:33:47.720 by CHART Support				
Lane Configuration Data	<table> <tr> <th>Southbound</th><th>Northbound</th></tr> <tr> <td>↓ ↓ ↓ ↓ ↓ ↓ ↓</td><td>↑ ↑ ↑ ↑ ↑</td></tr> </table>	Southbound	Northbound	↓ ↓ ↓ ↓ ↓ ↓ ↓	↑ ↑ ↑ ↑ ↑
Southbound	Northbound				
↓ ↓ ↓ ↓ ↓ ↓ ↓	↑ ↑ ↑ ↑ ↑				
Baltimore County: MD 26 EAST/WEST AT WARDS CHAPEL RD					
Type	Incident (Utility Problem)				
Location	Baltimore County [MD 26 EAST/WEST AT WARDS CHAPEL RD]				
Direction	East/West				
Details	All Westbound Lanes Open 1 of 1 Eastbound Shoulders Closed Created: 2016-01-20 13:04:58.213 by SOC				
Lane Configuration Data	<table> <tr> <th>Westbound</th><th>Eastbound</th></tr> <tr> <td>↓ ↓ ↓</td><td>↑ ↑</td></tr> </table>	Westbound	Eastbound	↓ ↓ ↓	↑ ↑
Westbound	Eastbound				
↓ ↓ ↓	↑ ↑				

Figure 19: ATMS Weather Related Incidents

<div> <div> <div>●●●○○ AT&T</div> <div>12:23 PM</div> <div>10.0.0.4</div> </div> <div> <div>📶</div> <div>📶</div> <div>📶</div> </div> <div> <div>🔋 93%</div> <div>🔋</div> </div> </div>	
Weather Events	
Anne Arundel County: I-97 SOUTH/NORTH AT BENFIELD BLVD	
Type	incident (weather closure winter precip)
Location	Anne Arundel County [I-97 SOUTH/NORTH AT BENFIELD BLVD]
Direction	North/South
Details	1 of 1 Southbound Left Acceleration Lanes Closed 1 of 1 Northbound Left Acceleration Lanes Closed Created: 2016-04-05 09:30:56.610 by CHART Support
Lane Configuration Data	<div> <div>Southbound</div> <div>Northbound</div> </div>
Anne Arundel County: I-97 SOUTH/NORTH AT BALTO ANNAPOLIS BLVD	
Type	incident (weather closure high water)
Location	Anne Arundel County [I-97 SOUTH/NORTH AT BALTO ANNAPOLIS BLVD]
Direction	North/South
	1 of 1 Southbound Right

Figure 20: Weather Related Incident - Smart Phone

ATMS Road Closures will also be displayed on the Traffic Incidents and Closures tab. The background color will be light blue to easily distinguish them from the other event types. If no

closures exist, a message will be displayed indicating that currently there are no reported closures.

Road Closures					
Allegany County: US 220 NORTH BETWEEN RAWLINGS LA AND FORT HILL RIDGE RD					
Type	Planned Roadway Closure				
Location	Allegany County [US 220 NORTH BETWEEN RAWLINGS LA AND FORT HILL RIDGE RD]				
Direction	North				
Details	1 of 1 Southbound Traffic Lanes Bidirectional 1 of 1 Northbound Shoulders Closed 1 of 1 Northbound Traffic Lanes Closed Created: 2016-01-20 08:53:34.637 by TOC7				
Lane Configuration Data	<table> <tr> <th>Southbound</th><th>Northbound</th></tr> <tr> <td>↓</td><td>↑</td></tr> </table>	Southbound	Northbound	↓	↑
Southbound	Northbound				
↓	↑				
Anne Arundel County: MD 2 NORTH AT FAIRHAVEN RD					
Type	Planned Roadway Closure				
Location	Anne Arundel County [MD 2 NORTH AT FAIRHAVEN RD]				
Direction	North				
Details	All Southbound Lanes Open 1 of 1 Northbound Shoulders Closed Created: 2016-01-15 10:01:56.630 by SOC				
Lane Configuration Data	<table> <tr> <th>Southbound</th><th>Northbound</th></tr> <tr> <td>↓</td><td>↑</td></tr> </table>	Southbound	Northbound	↓	↑
Southbound	Northbound				
↓	↑				
Anne Arundel County: MD 2 NORTH AT OLD SOLOMONS ISLAND RD					
Type	Planned Roadway Closure				
Location	Anne Arundel County [MD 2 NORTH AT OLD SOLOMONS ISLAND RD]				
Direction	North				
Details	All Southbound Lanes Open 1 of 1 Northbound Shoulders Closed Created: 2016-01-20 08:56:20.317 by SOC				
Lane Configuration Data	<table> <tr> <th>Southbound</th><th>Northbound</th></tr> <tr> <td>↓</td><td>↑</td></tr> </table>	Southbound	Northbound	↓	↑
Southbound	Northbound				
↓	↑				
Anne Arundel County: I-695 INNER LOOP AT EXIT 8 MD 168 NURSERY RD (NB)					
Type	Planned Roadway Closure				
Location	Anne Arundel County [I-695 INNER LOOP AT EXIT 8 MD 168 NURSERY RD (NB)]				
Direction	Inner Loop				
Details	1 of 1 Inner Loop Shoulders Closed 1 of 3 Inner Loop Traffic Lanes Closed All Outer Loop Lanes Open Created: 2016-01-20 08:46:37.947 by SOC				

Figure 21: Road Closures - Desktop Browser

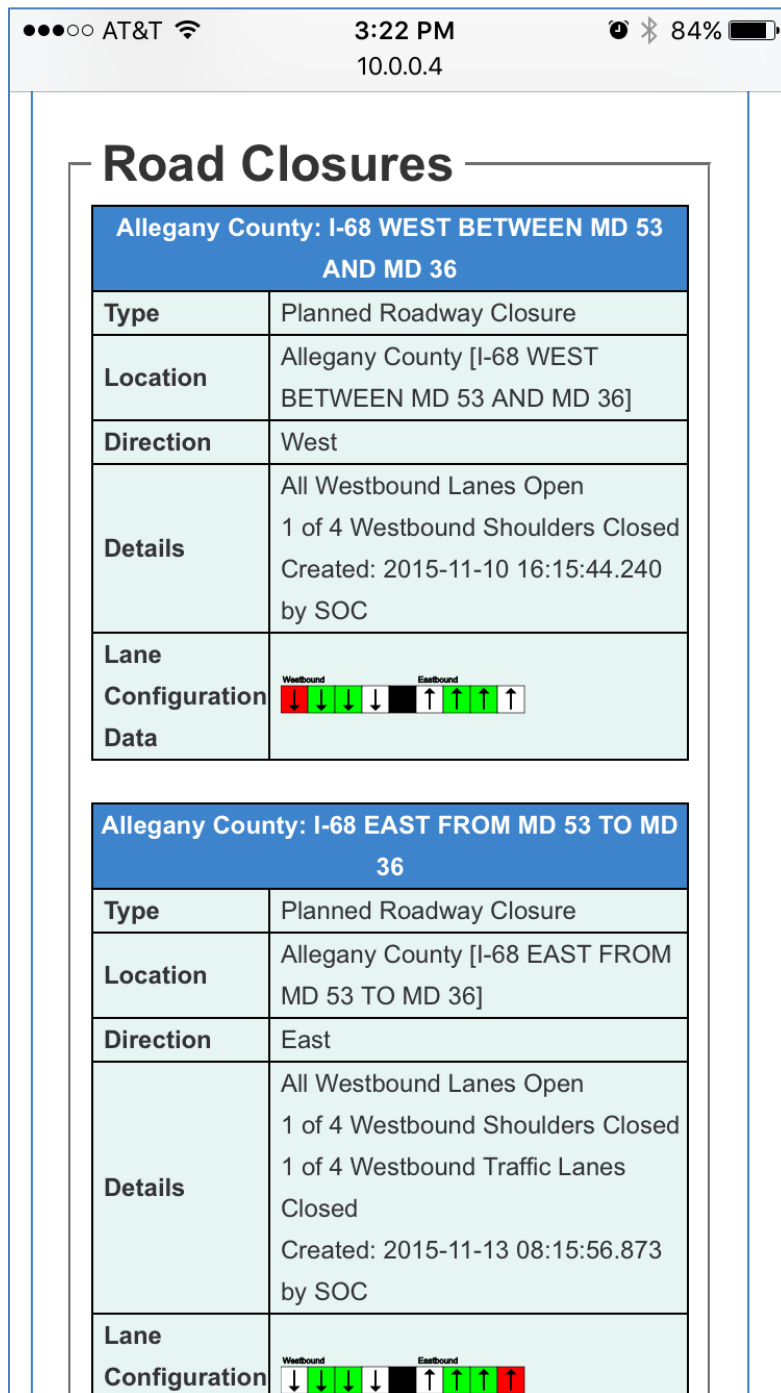


Figure 22: Road Closures - Smart Phone

The Maryland Highway & Traffic Information page will display a second tab labeled "Other Traffic Events". The Other Traffic Events tab will display the following event types from ATMS:

- Disabled Vehicles
- Action Events

- Traffic Congestion
- Special Events

These event types do not contain lane configuration data. The following information will be displayed for each event:

- Event Type
- County
- Location
- Direction
- Source
- Date/time Received

Data on the Other Traffic Events tab may be filtered by county and/or event type. A message will be displayed when no current data exists.

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Traffic incidents, weather road closures, active construction and maintenance closures information.

[Click here for traffic event descriptions](#)

Traffic Incidents & Closures

Other Traffic Events

Traffic Alerts

This data will refresh every 90 seconds

Last refreshed at: 9:04:50 AM

Filter Data By County:

All Counties

*Note: If your county is not displayed, it means we have no reported activity in that county.

Filter Data By Type:

All Incident Types

Other Traffic Events

Event Type	County	Location	Direction	Source	Date/Time Received
Disabled Vehicle	Baltimore City	I-70 EAST AT MP 93.5	East	CHART Support	2016-04-05 10:24:46.927
Disabled Vehicle	Baltimore County	I-83 NORTH PRIOR TO I-695	North	SOC	2016-01-20 14:17:57.500
Disabled Vehicle	Unspecified	MD	None	CHART Support	2016-04-05 09:30:06.317
Action Event	Anne Arundel County	ERT (01/20/2016)	None	SOC	2016-01-20 00:43:50.397
Action Event	Anne Arundel County	I-195 EAST/WEST PAST MD 170 (BALTIMORE WASHINGTON INTL AIPOET)	East/West	MAA BWI	2015-03-31 14:09:54.653
Action Event	Calvert County	MD 402 WEST AT BRANCH ST	West	CHART Support	2016-04-05 10:34:55.430
Action Event	Kent County	US 301 SOUTH/NORTH AT MP 100	North/South	CHART Support	2016-04-05 10:36:26.220
Action Event	Washington County	I-68 EAST/WEST AT MOUNTAIN RD	East/West	CHART Support	2016-04-05 10:37:16.653
Recurring Congestion	Baltimore County	MD 140 WEST BETWEEN AVALON WAY AND MAIN ST	West	CHART Support	2016-04-05 09:14:05.643

Figure 23: Other Traffic Events - Desktop Browser

Other Traffic Events	
EventType	Disabled Vehicle
County	Baltimore City
Location	I-95 NORTH PAST EXIT 60 MORAVIA RD (NB) M.M. 60.4
Direction	North
Source	AOC Central
Date/Time Received	2015-11-13 09:33:25.140
EventType	Action Event

Figure 24: Other Traffic Event - Smart Phone

When ATMS events exist in CHARTWeb that are designated with Traffic Alert Status, a Traffic Alerts tab will be displayed. ATMS Traffic Incidents and ATMS Road Closures may be designated as Traffic Alerts so either type may appear on the Traffic Alerts tab. The data and display characteristics of Traffic Alerts are the same as previously described for other incidents. Traffic Incidents may be filtered by county.

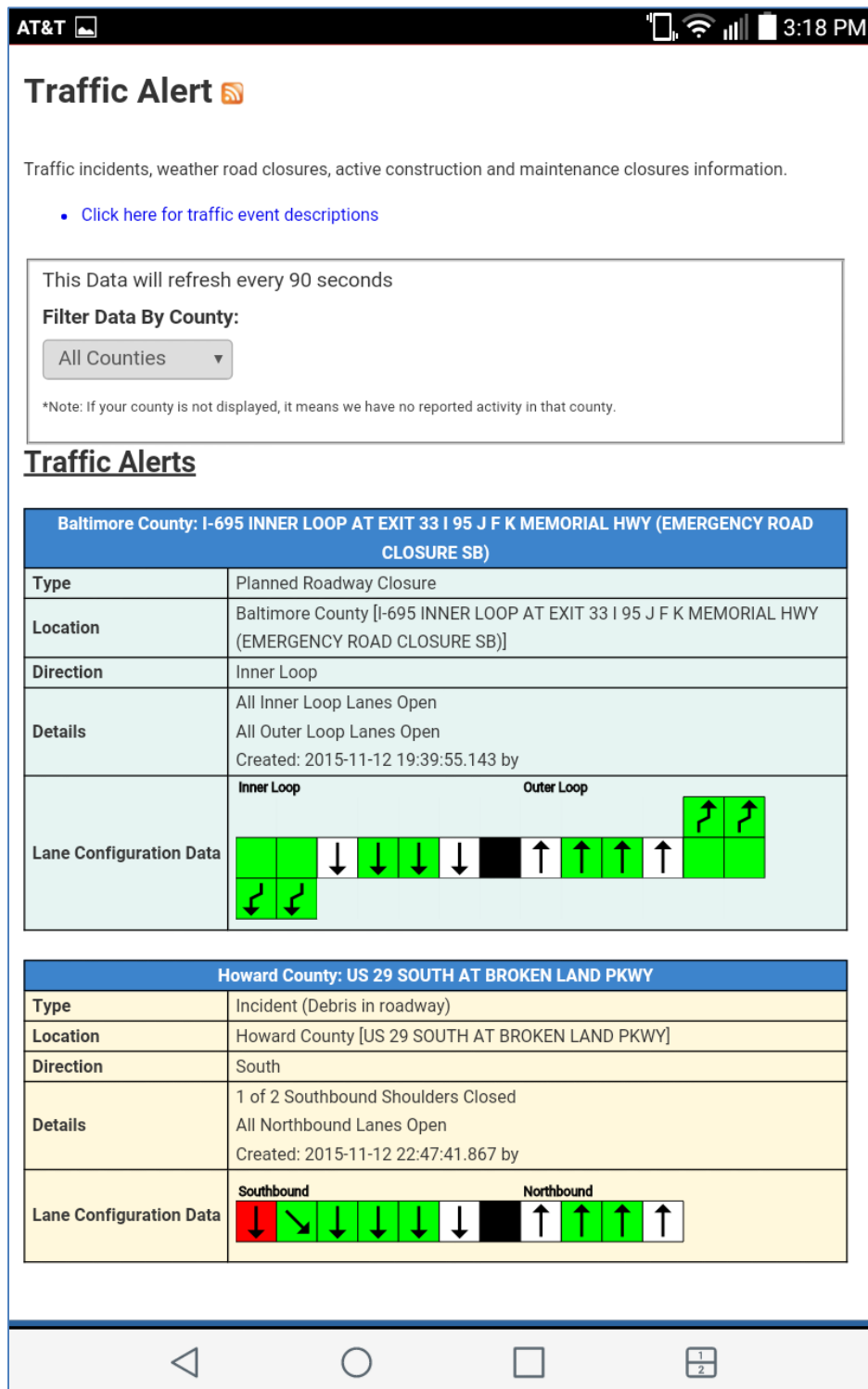


Figure 26: Traffic Alerts Tab - Smart Phone

4.1.6 Traffic Alerts Page

The Traffic Alerts Page will receive updates to make it mobile-friendly as well. The changes are identical to those described for the Maryland Highway & Traffic Information page.

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Traffic Alert

Traffic incidents, weather road closures, active construction and maintenance closures information.

Click here for traffic event descriptions

This Data will refresh every 90 seconds

Filter Data By County:

All Counties

*Note: If your county is not displayed, it means we have no reported activity in that county.

Traffic Alerts

Anne Arundel County: US 50 EAST EAST OF OCEANIC DR (BAY BRIDGE TOLL PLAZA)

Type	Incident (Other)
Location	Anne Arundel County [US 50 EAST EAST OF OCEANIC DR (BAY BRIDGE TOLL PLAZA)]
Direction	East
Details	1 Vehicle Involved All Westbound Lanes Open 2 of 11 Eastbound Toll Lanes Closed 2 of 11 Eastbound Toll Lanes Bidirectional Created: 2016-04-04 08:52:44.600 by CHART Support
Lane Configuration Data	<div><div>Westbound</div><div>Eastbound</div></div>

Anne Arundel County: I-695 INNER LOOP AT EXIT 8 MD 168 NURSERY RD (NB)

Type	Planned Roadway Closure
Location	Anne Arundel County [I-695 INNER LOOP AT EXIT 8 MD 168 NURSERY RD (NB)]
Direction	Inner Loop
Details	1 of 1 Inner Loop Shoulders Closed 1 of 3 Inner Loop Traffic Lanes Closed All Outer Loop Lanes Open Created: 2016-01-20 08:46:37.947 by SOC
Lane Configuration Data	<div><div>Inner Loop</div><div>Outer Loop</div></div>

Figure 27: Traffic Alerts Page - Desktop Browser

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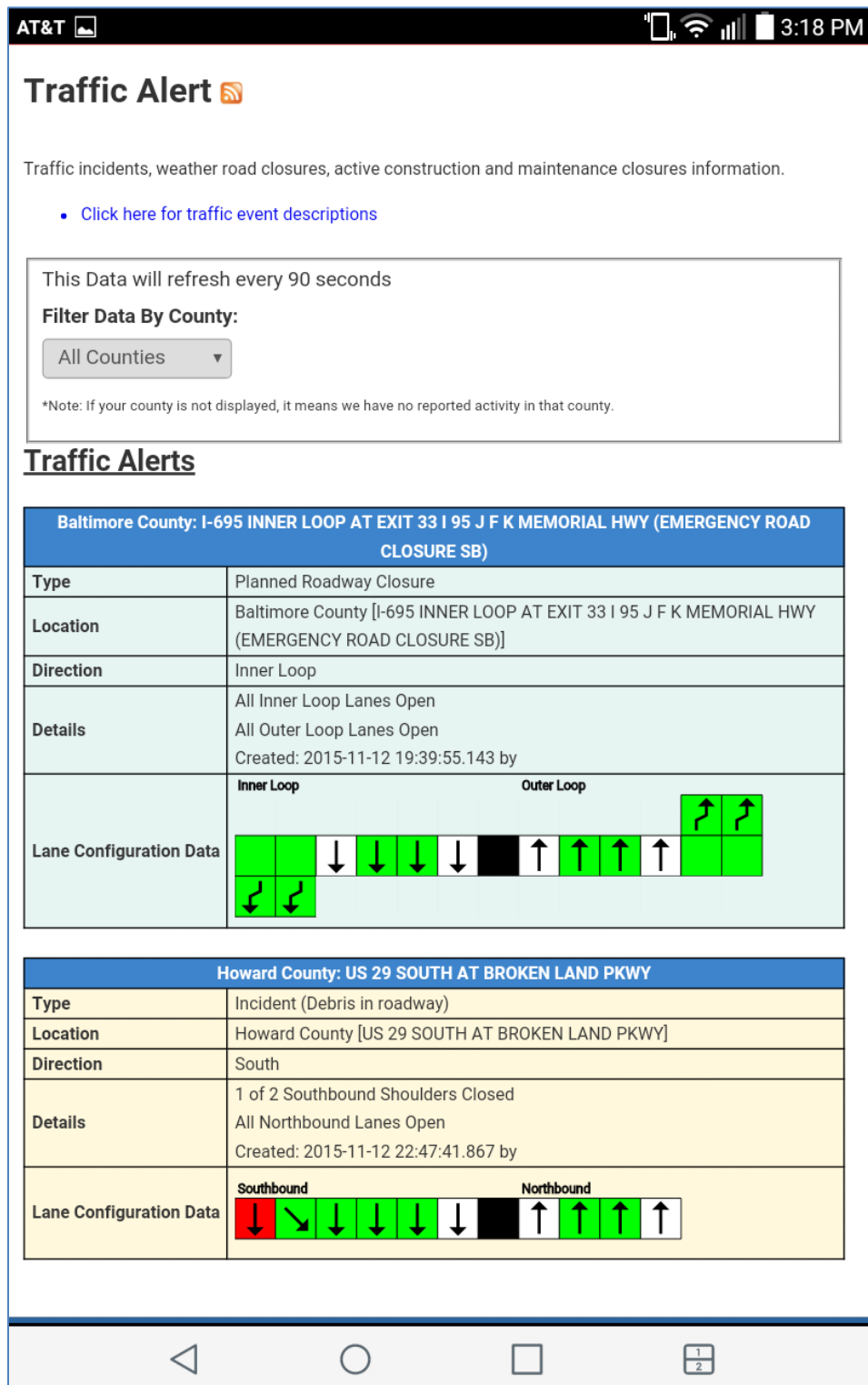


Figure 28: Traffic Alerts Page - Smart Phone

4.1.7 Planned Lane Closures Page

The Planned Lane Closures page will display LCP closures that have been approved. The page will be updated to make it more mobile friendly.

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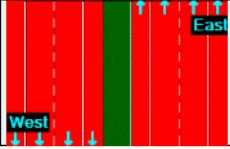
Links

Planned Lane Closures


If you would like information regarding I-95 Express Toll Lanes Closures please see our [I-95 Express Toll Lanes Closures](#) page.

All Counties

BALTIMORE COUNTY: MD-150 EAST/WEST FROM (MD - 151) - NORTH POINT BLVD (MD - 150) TO (CO - 5141) - 54TH ST (MD - 150)

Type	Activated Permit: LONG TERM CONTINUOUS
Location	BALTIMORE COUNTY: MD-150 EAST/WEST FROM (MD - 151) - NORTH POINT BLVD (MD - 150) TO (CO - 5141) - 54TH ST (MD - 150)
Direction	East/West
Lane(s) Closed	2/2 Westbound-both Shoulders, 2/2 Eastbound-both Shoulders closed
Details:	Duration: 2015-09-10 to 2016-06-29, 9:00 PM - 5:00 AM Reason for Closure: Resurface & Rehab Days Closed: SUNDAY, MONDAY, FRIDAY, SATURDAY
Lane Configuration Data	

BALTIMORE COUNTY: MD-25 SOUTH/NORTH FROM (MD - 137) - MT CARMEL RD (MD - 25) TO (CO - 3) - GUNPOWDER RD (MD - 25)

Type	Activated Permit: LONG TERM CONTINUOUS
Location	BALTIMORE COUNTY: MD-25 SOUTH/NORTH FROM (MD - 137) - MT CARMEL RD (MD - 25) TO (CO - 3) - GUNPOWDER RD (MD - 25)
Direction	South/North
Lane(s) Closed	1/1 Southbound, 1/1 Northbound closed
Details:	Duration: 2015-12-31 to 2016-06-29, 12:00 AM - 12:00 AM Reason for Closure: Bridge Construction Days Closed: SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, SATURDAY
Lane Configuration Data	

HARFORD COUNTY: I-95 SOUTH FROM STATE MILEPOST 76.99 (I - 95) TO STATE MILEPOST 73.0 (I - 95)

Type	Activated Permit: LONG TERM CONTINUOUS
Location	HARFORD COUNTY: I-95 SOUTH FROM STATE MILEPOST 76.99 (I - 95) TO STATE MILEPOST 73.0 (I - 95)

Figure 29: Planned Lane Closures - Desktop Browser

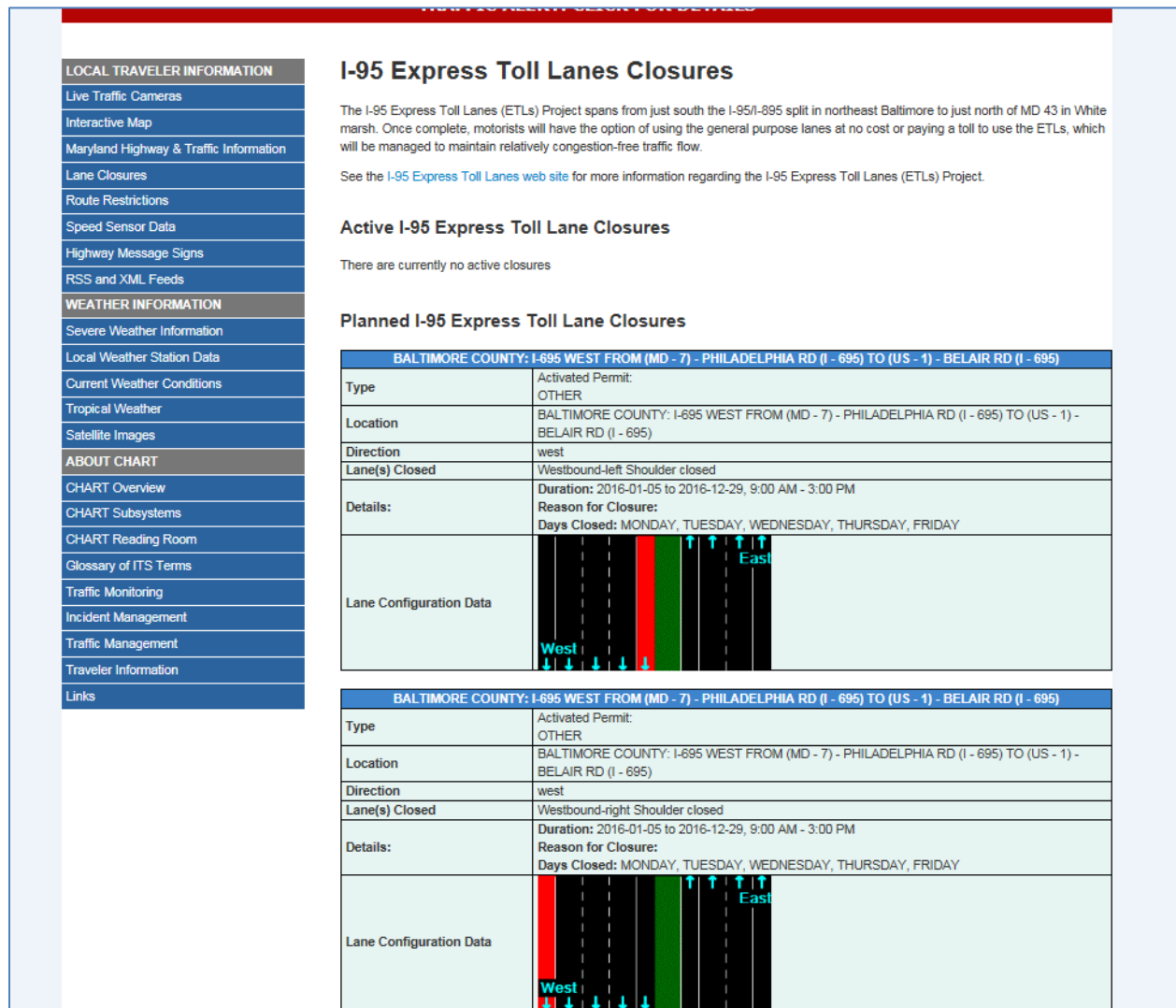


Figure 31: I-95 Express Toll Lane Closures - Desktop Browser

**BALTIMORE COUNTY: I-695 WEST FROM (MD - 7) -
PHILADELPHIA RD (I - 695) TO (US - 1) - BELAIR
RD (I - 695)**

**BALTIMORE COUNTY: I-695 WEST FROM (MD - 7) -
PHILADELPHIA RD (I - 695) TO (US - 1) - BELAIR
RD (I - 695)**

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5 Deprecated Functionalities

5.1 CHARTWeb

The existing map and all related code will be completely removed from the site.

5.1.1 Live Traffic Cameras Page

The existing Live Traffic Cameras will be left in place with a message telling users about our new page and asking them to update their bookmarks.

5.1.2 Maryland Highway and Traffic Information Page

The Microsoft .NET page will be replaced to a PHP page. The Microsoft .NET page will be altered to display a message indicating that the page has been moved, a link to the new page and a suggestion that the user updates their bookmarks.

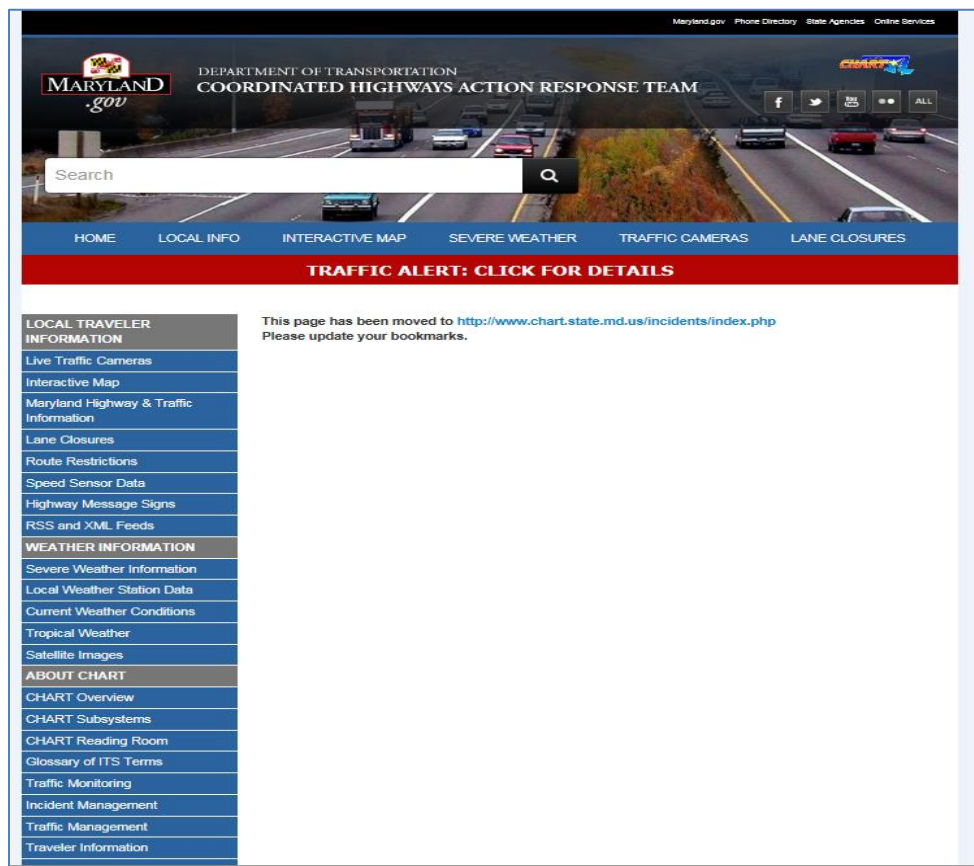


Figure 33: Redirect page for Maryland Highway & Traffic Information Page

5.1.3 Traffic Alerts Page

The Traffic Alerts page will be rewritten in PHP and the previous page will be replaced. In case users have the old page bookmarked, the old page will be updated to notify the user that the page has been moved and will have a link to the new page with a suggestion that the user update their bookmarks.

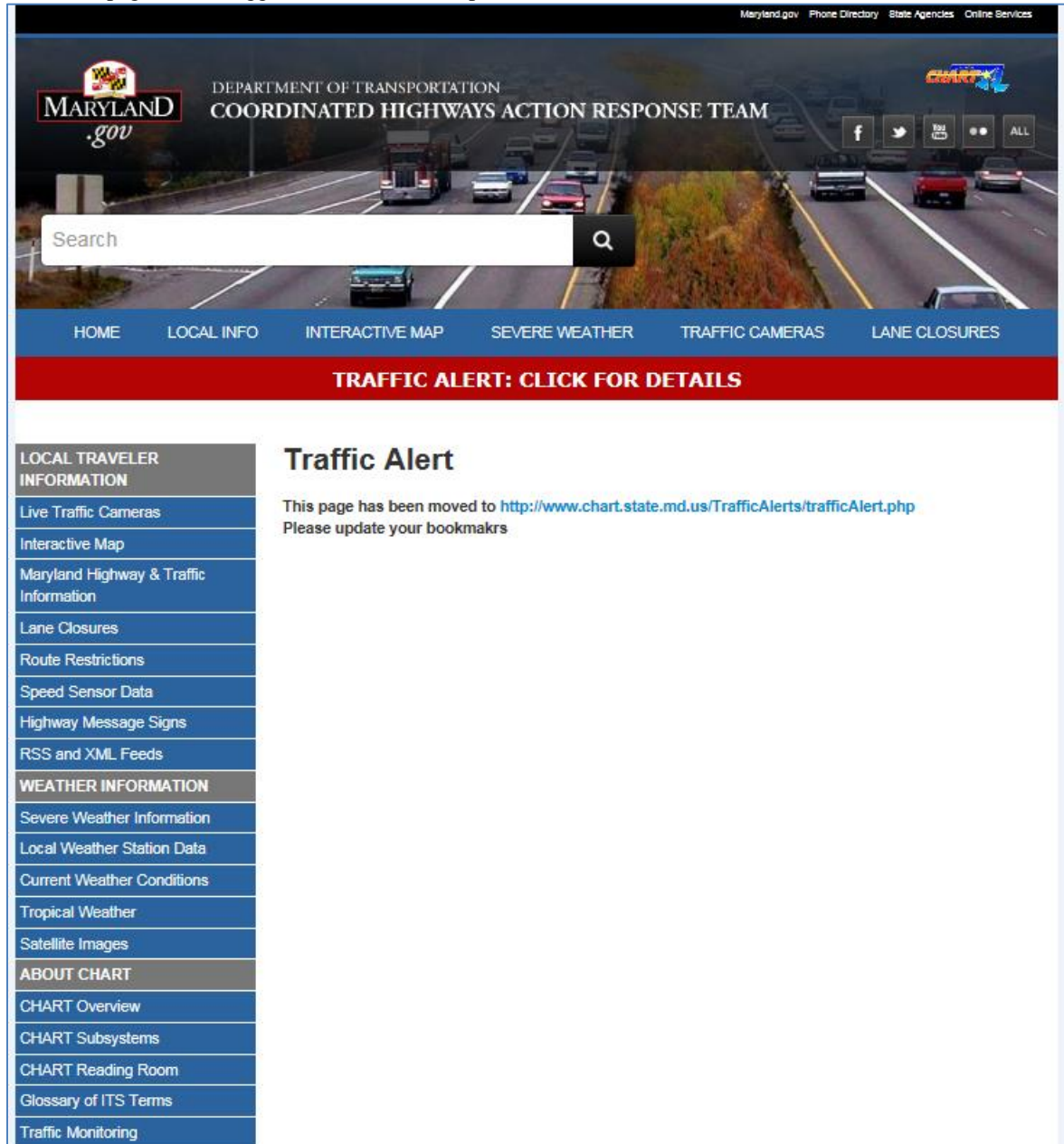



Figure 34: Traffic Alerts Redirect Page

5.1.4 Planned Closures Page






The Planned Closures page will be rewritten in PHP. The old page will be updated to notify that the user the page has been moved and provide them with a link to the new page.




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I-95 Express Toll Lanes Closures

The I-95 Express Toll Lanes (ETLs) Project spans from just south the I-95/I-895 split in northeast Baltimore to just north of MD 43 in White marsh. Once complete, motorists will have the option of using the general purpose lanes at no cost or paying a toll to use the ETLs, which will be managed to maintain relatively congestion-free traffic flow.

See the [I-95 Express Toll Lanes web site](#) for more information regarding the I-95 Express Toll Lanes (ETLs) Project.

This page has been moved to http://www.chart.state.md.us/road_closures/closureDetails.asp
Please update your bookmarks

Figure 35: I-95 Express Toll Lane Closures Redirect Page

6 Acronyms/Glossary

LCP	Lane Closure Permits application used to manage SHA and MDTA lane closure permitting.
Home Page	The main page of the LCP application, always open if the user is logged in.
Permit	An LCP permit, providing information about roadwork that is permitted to take place.
RAM	Roadway Approval Manager
DPT	District Approval By Permit Type
WML	Workflow Manager Log
GIS	Geographic Information System (GIS) is any system that captures, stores, analyzes, manages, and presents data that are linked to location
Intranet Map	The CHART Mapping application that is not integrated into the CHART user interface.
REST	Representational State Transfer - a web services architecture style used in CHART that leverages web technologies such as http and XML